

**REMARKS**

As a preliminary matter, the Examiner has objected to the drawings under 37 C.F.R. § 1.83(a) as not showing every feature of the invention specified in the claims. In particular, the Examiner asserts that the pulse compressor of Claim 43, the capacitor bank of Claim 44, the power on-off switch of Claim 46, the logic control element of Claim 46, and the cryogenic target injector of Claim 51 must be shown. Applicants respectfully disagree with this assertion. More specifically, all of these features are well known to a person of ordinary skill in the art. Therefore, it is not necessary to depict these well known features. However, to expedite the prosecution of the current Application, Figs. 1A and 1B have been amended as requested by Examiner.

As another preliminary matter, the Examiner has objected to certain portions of the specification and certain claims because of various informalities. The Examiner has also rejected Claim 54 under 35 U.S.C. § 112, second paragraph, as lacking antecedent basis for one of the phrases therein. Applicants have currently amended the objected/rejected claims and portions of the specification. Accordingly, Applicant respectfully asserts that these claims and portions of the specification are now in acceptable form. Therefore, Applicants respectfully request Examiner remove the objections to certain portions of the specification and certain claims because of various informalities, as well as the rejection of Claim 54 under 35 U.S.C. § 112, second paragraph.

The Examiner has rejected Claims 29, 3, 32, 34, 35, 37-47, and 54-56 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Pub. No. 2005/0230645 to Melnychuk et al. ("Melnychuk"). The Examiner has also rejected Claims 30, 36, 48, 49, 52, and 53 under 35 U.S.C. § 103(a) as being unpatentable over Melnychuk. In addition, the Examiner has objected to Claims 33, 50, 51, and 57 as being dependent upon a rejected base claim. However, Examiner has conceded that Claims 33, 50, 51, and 57 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 29-57 stand currently amended. Claims 1-28 stand previously canceled. Claims 29-57 are currently pending. The following remarks are considered by applicant to overcome each of the Examiner's outstanding rejections to current Claims 29-57. An early Notice of Allowance is therefore requested.

**I. SUMMARY OF RELEVANT LAW**

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The determination of obviousness rests on whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. In determining obviousness, four factors should be weighed: (1) the scope and content of the prior art, (2) the differences between the art and the claims at issue, (3) the level of ordinary skill in the art, and (4) whatever objective evidence may be present. Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor. The Examiner carries the burden under 35 U.S.C. § 103 to establish a prima facie case of obviousness and must show that the references relied on teach or suggest all of the limitations of the claims.

**II. REJECTION OF CLAIMS 29, 31, 32, 34, 35, 37-47, AND 54-56 UNDER 35 U.S.C. § 102(E)**  
**BASED ON MELNYCHUK**

On page 5 of the current Office Action, the Examiner rejects Claims 29, 31, 32, 34, 35, 37-47, and 54-56 under 35 U.S.C. § 102(e) as being anticipated by Melnychuk. These rejections are respectfully traversed and believed overcome in view of the following discussion.

**Claims 29, 31, 32, 34, 35, and 37-41**

Claim 29 states, in part:

“providing that the time constant of the laser produced plasma expansion time **exceeds** the characteristic time constant of the discharge.” (emphasis added).

Examiner asserts that Melnychuk discloses the above language of Claim 29. This, however, misinterprets the teachings of Melnychuk.

First, Examiner's analysis hinges on the assertion that Melnychuk discloses a time constant of the electric discharge to be 30-100 ns. In support of this assertion, Examiner cites paragraph [0133] of Melnychuk. However, that paragraph actually states:

“[0133] The device is mainly a discharge-produced EUV light source that has the additional benefits of laser-plasma supported discharge initiation. The **electrodes** can be connected to the same pulsed-power system that is used presently (and in the future) for the DPF machines. (10 J to 20 J delivered pulse energy, **30-100 ns pulse length**, repetition rate of several kHz, peak voltage of several kV, peak current several tens of kA.) The inner electrode can be charged positive or negative. The outer electrode is at ground potential. As shown in FIG. 4C the electrode arrangement is somewhat different from the DPF arrangement. The (water-cooled) electrodes are bigger and the electrode surface involved in the discharge is bigger. It is on the order of 30 to 50 cm<sup>2</sup>. There is an insulator disk between the electrodes to prevent a discharge along the direct line-of-sight.” (emphasis added).

The above section of Melnychuk relates to pulse length, and not a time constant. As such, Melnychuk teaches that the pulse length of the electric discharge is 30-100 ns, and not that the time constant of the electric discharge is 30-100 ns. Moreover, Melnychuk never even mentions a time constant for the electric discharge (or for the laser produced plasma expansion time for that matter). In fact, Melnychuk never discusses a time constant of any type. Since Melnychuk fails to disclose a time constant of the electric discharge, Melnychuk must also fail to disclose that the time constant of the laser produced plasma expansion time exceeds the characteristic time constant of the discharge, as stated in Claim 29.

Second, Examiner's analysis also hinges on the assertion that, because Melnychuk discloses a similar laser source and target, that the laser produced plasma expansion time must inherently be similar. This, however, is simply not the case.

As a primary matter, Examiner's assertion that Melnychuk discloses a similar target is incorrect. The target discussed in the specification of the current application is a dense target with a density of more than 10<sup>19</sup> atoms/cm<sup>3</sup>. Conversely, the target of Melnychuk is a low-

density gas. Melnychuk, ¶ [0135]. As such, the targets are not similar, which alone discredits Examiner's inherency argument.

As a secondary matter, even if the laser source and target of Melnychuk were similar the that which is disclosed in the current application (which Applicants dispute), such a mere similarity does not necessarily mean that the time constant of the laser produced plasma expansion time of Melnychuk must inherently be the same as that disclosed in the current application. All it means is that the time constants may be similar, not that the time constants are necessarily similar.

The MPEP contains clear instructions on establishing inherency. "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." MPEP § 2112 (quoting *Ex parte Levy*, 17 USPQ2d 1451, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original)) (internal quotations omitted). "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." MPEP § 2112 (citing *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993)) (emphasis in original). "Also, '[a]n invitation to investigate is not an inherent disclosure' where a prior art reference 'discloses no more than a broad genus of potential applications or its discoveries.'" MPEP § 2112 (quoting *Metabolife Labs., Inc. v. Lab. Corp. of Am. Holdings*, 370 F.3d 1354, 1367 (Fed. Cir. 2004)). "A prior art reference that discloses a genus still does not inherently disclose all species within that broad category' but must be examined to see if a disclosure of the claimed species has been made or whether the prior art reference merely invites further experimentation to find the species." MPEP § 2112 (quoting *Metabolife Labs., Inc.*, 370 F.3d at 1367).

Since the Examiner has failed to prove that the time constant of the laser produced plasma expansion time of Melnychuk is necessarily the same as that of the current Application, Examiner cannot use the time constant disclosed in the current application as an inherent feature of Melnychuk.

In addition, the Examiner much provide a basis in fact and/or technical reasoning for his assertion of inherency. However, Examiner merely asserts that the laser source and target of Melnychuk and the current Application are similar. This is simply an unsupported conclusory statement. Rather, if Examiner is to provide a basis in fact and/or technical reasoning, Examiner must specifically show how the laser source and target of Melnychuk and the current Application are similar, and not just simply state the conclusion.

For all the above reasons, Applicants respectfully assert that Examiner has failed to support the assertion that Melnychuk inherently discloses a time constant of the laser produced plasma expansion time which is the same as that disclosed in the current Application. Since Melnychuk fails to disclose a time constant of the laser produced plasma expansion time, Melnychuk must also fail to disclose that the time constant of the laser produced plasma expansion time exceeds the characteristic time constant of the discharge, as stated in Claim 29.

Accordingly, Applicants respectfully assert that Examiner has failed to establish a prima facie case of anticipation of independent Claim 29, and corresponding Claims 31, 32, 34, 35, and 37-41 because they are each ultimately dependant from Claim 29. Therefore, Applicants respectfully request that Examiner remove the rejections of Claims 29, 31, 32, 34, 35, and 37-41 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Pub. No. 2005/0230645 to Melnychuk et al.

**Claims 42-47 and 54-56**

Similarly to Claim 29, Claim 42 states, in part:

“wherein said electrodes are combined with means for producing a rapid electric discharge in the plasma with a characteristic time constant which is **less than** the time constant of the laser produced plasma expansion time.” (emphasis added).

In other words, as with Claim 29, Claim 47 requires that the time constant of the laser produced plasma expansion time exceeds the time constant of the electric discharge.

As discussed above in relation to Claim 29, Melnychuk fails on multiple levels to disclose the above language of Claim 42.

Accordingly, Applicants respectfully assert that Examiner has failed to establish a prima facie case of anticipation of independent Claim 42, and corresponding Claims 43-47 and 54-56 because they are each ultimately dependant from Claim 42. Therefore, Applicants respectfully request that Examiner remove the rejections of Claims 42-47 and 54-56 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Pub. No. 2005/0230645 to Melnychuk et al.

**III. REJECTION OF CLAIMS 30, 36, 48, 49, 52, AND 53 UNDER 35 U.S.C. § 103(A) BASED ON MELNYCHUK**

On page 8 of the current Office Action, the Examiner rejects Claims 30, 36, 48, 49, 52, and 53 under 35 U.S.C. § 103(a) as being unpatentable over Melnychuk. These rejections are respectfully traversed and believed overcome in view of the following discussion.

Claims 30, 36, 48, 49, 52, and 53 are ultimately each dependent upon one of independent Claims 29 and 42. As Claims 29 and 42 are allowable, so must be Claims 30, 36, 48, 49, 52, and 53. Therefore, Applicants respectfully request that Examiner remove the rejections of Claims 30, 36, 48, 49, 52, and 53 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Pub. No. 2005/0230645 to Melnychuk et al.

**Claim 30**

In addition, Claim 30 states, in part:

“wherein the target is a gaseous, liquid, liquid spray, cluster spray or solid medium, such as a bulk or foil target, **more than  $10^{19}$  atoms/cm<sup>3</sup>**.” (emphasis added).

Examiner admits that Melnychuk fails to disclose the above claim language, but asserts that it would be obvious in light of Melnychuk to provide a target of the density of Claim 30. This, however, misinterprets the teachings of Melnychuk.

As discussed above, Melnychuk relates to a low-density target. Melnychuk, ¶ [0135]. There is no disclosure whatsoever in Melnychuk of any type of dense target, such as that

of Claim 30. Consequently, in Melnychuk, the laser plasma does not emit EUV, but only ionizes the gas target. As such, the teachings of Melnychuk are very different from those teachings relating to dense targets, such as that of Claim 30. Therefore, there is no motivation for one of ordinary skill in the art to think that the teachings of Melnychuk could be used for the dens target of Claim 30.

Furthermore, Examiner has cited no reference whatsoever that discloses a target with the density of Claim 30. As such, the only reason to use a target of the density of Claim 30 is in view of the disclosure of the current Application. This, however, would be improper use of hindsight.

Accordingly, Accordingly, Applicants respectfully assert that Examiner has failed to establish a prima facie case of obviousness of Claim 30. Therefore, Applicants respectfully request that Examiner remove the rejection of Claim 30 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Pub. No. 2005/0230645 to Melnychuk et al.

**IV. OBJECTION TO CLAIMS 33, 50, 51, AND 57 AS BEING DEPENDENT UPON A REJECTED BASE CLAIM**

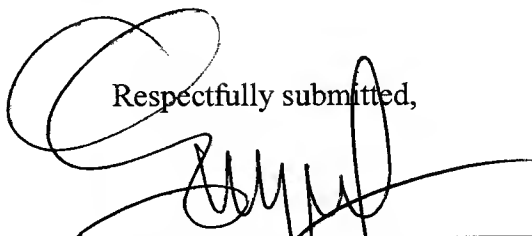
On page 11 of the current Office Action, the Examiner objects to Claims 33, 50, 51, and 57 as being dependent upon a rejected base claim. These objections are respectfully traversed and believed overcome in view of the following discussion.

Claims 33, 50, 51, and 57 are each ultimately dependent upon one of independent Claims 29 and 42. As Claims 29 and 42 are allowable, so must be Claims 33, 50, 51, and 57. Therefore, Applicants respectfully request that Examiner remove the objections to Claims 33, 50, 51, and 57 as being dependent upon a rejected base claim.

Based upon the above remarks, Applicant respectfully requests reconsideration of this application and its early allowance. Should the Examiner feel that a telephone conference

with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'Eugene LeDonne', written over a horizontal line.

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